

REMARKS

This Application has been carefully reviewed in light of the Office Action dated January 15, 2003. Claims 1 to 19 are in the application, of which Claims 1 and 10 have been amended. Claims 1, 8, 18 and 19 are the independent claims herein. Reconsideration and further examination are respectfully requested.

It is noted that this Amendment has been prepared in accordance with the revised format set forth in the Pre-Official Gazette notice entitled "Amendments in a Revised Format Now Permitted" signed January 31, 2003, posted on the USPTO web site.

Applicant wishes to thank the Examiner for the indication that Claims 10 to 12 would be allowable if rewritten in independent form, including all of the limitations of the base claims. Applicant has chosen not to rewrite the claims at this time since the base claims for each of Claims 10 to 12 are believed to be allowable for at least the reasons set forth below.

The specification and Claims 10 to 12 were objected to for informalities. The specification and Claim 10 have been amended giving due consideration to the points noted in the Office Action and therefore, withdrawal of the objections is respectfully requested.

The drawings were objected to for allegedly not containing reference numeral 600 mentioned in the specification. The specification has been amended to delete reference numeral 600 and therefore, no changes to the drawings are required. Accordingly, withdrawal of the objection to the drawings is respectfully requested.

Claims 10 to 12 were rejected under 35 U.S.C. § 112, first paragraph.

Claim 10 has been amended giving due consideration to the points noted in the Office Action and therefore, withdrawal of the § 112 rejection is respectfully requested.

Claims 1 to 5 and 18 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,220,441 (Gerstenberger), Claims 6 and 7 were rejected over Gerstenberger in view of U.S. Patent No. 5,867,591 (Onda), Claims 8, 13 to 17 and 19 were rejected over Berstenberger in view of Onda and further in view of U.S. Patent No. 5,197,962 (Chen), and Claim 9 was rejected over Gerstenberger in view of Onda and Chan and further in view of U.S. Patent No. 4,745,562 (Prazdny). The rejections are respectfully traversed and the Examiner is requested to reconsider and withdraw the rejections after carefully considering the following points.

The present invention concerns locating matching points in two original images of a scene, a left and a right image. According to the invention, a first point is selected within an overlap area in the right image. A correspondence search is run using the first point to find a first matching point in the left image. A second correspondence search is run using the first matching point to find a second matching point in the right image, wherein the correspondence search is not run on any points to the left of the first point. Then, a match point comprising the first matching point and the second matching point is selected. In an additional aspect of the invention, in conjunction with the foregoing process, the left and right images may first be split into subimages, where each subimage comprises the values of only one of the color coordinates used to define the image with which is associated, and each left and right subimage that uses the same color coordinates being paired.

As a result of the foregoing, stereo matching errors caused by image occlusions that occur in conventional image processes can largely be avoided and the accuracy for stereo matching processes can be improved.

With specific reference to the claims, Claim 1 is a method for locating matching points in two original images of a scene, a left image and a right image, such that the images have at least some overlap area, the method comprising selecting a first point within the overlap area in the right image, running a first correspondence search using the first point to find a first matching point in the left image, running a second correspondence search using the first matching point to find a second matching point in the right image, wherein the correspondence search is not run on any points to the left of the first point, and selecting a match point comprising the first matching point and second matching point.

Claim 8 includes features similar to Claim 1, but with additional features. As such, Claim 8 is a method for locating matching points in two original images of a scene, a left image and a right image, such that the images have at least some overlap area, the method comprising splitting the left image and a right image into left subimages and right subimages, respectively, wherein each subimage comprises the values of only one of the color coordinates used to define the image with which it is associated, pairing each left subimage with the right subimage which uses the same color coordinate values, and running a first correspondence search on each point in the overlap area of the right subimage, search comprising the steps of running a correspondence search using a first point to find a first matching point in the left subimage, running a second correspondence search on the first matching point to find a second matching point in the right subimage,

wherein the correspondence search is not run on any points to the left of the first matching point, selecting match points using the first matching point and a second matching point is also included in the first correspondence search, and storing each selected match point in a list of match points.

Independent Claim 18 is a system claim substantially corresponding to Claim 1, and Claim 19 is a computer-readable medium claim that substantially corresponds to Claim 8.

The applied art, alone or in combination, is not seen to disclose or to suggest the features of Claims 1, 8, 18 and 19, and in particular, is not seen to disclose or to suggest at least the feature of running a second correspondence search on a first matching point to find a second matching point in a right subimage, wherein the correspondence search is not run on any points to the left of the first matching point.

Gerstenberger is seen to disclose a mechanism for detecting parallax between a first image array 21 and a second image array 22 (Fig. 5). This image parallax is detected by conducting a search to match pixels in a sub-array of second image array 22 with corresponding pixels in a sub-array of first image array 21. The matching process in Gerstenberger begins by establishing various reference points 25 in first image array 21. These reference, or “starting” points, are evenly distributed throughout first image array 21. A like sub-array of “tentative” tie point 26 that correspond to reference points 25 are similarly located throughout second image array 22. Once the “tentative” tie points 26 are determined, a correlation search is conducted on the second image array 22 to find another set of tie point pixels 26', which actually correspond to reference points 25 of first image

array 21. The correlation search uses the "tentative" tie points 26 as a guide to determine the actual tie point pixels 26'. Thereafter, parallax measurements are performed to determine parallax between tie point pixels 26' and "tentative" tie points 26. Using these tie point based parallax measurements as starting points, the parallax between the remaining pixels of the two image array is then determined by iterative search and correlate operations in the second image array 22, similar to those used for location "tie point" pixels. (See, for example, column 2, line 59 et. seq and Fig. 6). Thus, unlike the present invention, Gerstenberger does not run a second correspondence search on a first matching point to find a second matching point in a right subimage, wherein the correspondence search is not run on any points to the left of the first matching point.

In view of the foregoing deficiencies of the applied art, independent Claims 1, 8, 18 and 19, as well as the claims dependent therefrom, are believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicant's undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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